

WHAT IS CLAIMED IS:

1 1. For use in a base station of a code division multiple
2 access (CDMA) wireless network, wherein said base station
3 communicates with a plurality of wireless access terminals using
4 transmit beams formed by an adaptive antenna array, an apparatus
5 for allocating orthogonal codes used for downlink transmissions to
6 said plurality of wireless access terminals comprising:

7 a database capable of storing R active wireless terminal
8 records, each of said R active wireless terminal records
9 containing: 1) an active orthogonal code and 2) corresponding
10 downlink beamforming coefficients used to communicate with one of
11 said wireless access terminals; and

12 a controller associated with said database capable of
13 receiving a notification that a new wireless access terminal is
14 accessing said base station and, in response to said notification,
15 comparing said each of said R active wireless terminal records to
16 new downlink beamforming coefficients suitable for forming a
17 downlink transmit beam for transmitting to said new wireless access
18 terminal and, in response to said comparison, determines at least
19 one active wireless terminal record containing corresponding
20 downlink beamforming coefficients that have the least correlation
21 with said new downlink beamforming coefficients.

1 2. The apparatus as set forth in Claim 1 wherein said
2 controller assigns an active orthogonal code in said at least one
3 active wireless terminal record to be used in downlink
4 transmissions to said new wireless access terminal.

1 3. The apparatus as set forth in Claim 2 wherein said base
2 station uses up to K orthogonal codes for said downlink
3 transmissions and said controller compares said each of said R
4 active wireless terminal records to said new downlink beamforming
5 coefficients in response to a determination that all of said K
6 orthogonal codes are in use.

1 4. The apparatus as set forth in Claim 3 wherein said
2 controller determines a first plurality of active wireless terminal
3 records containing corresponding downlink beamforming coefficients
4 that have the least correlation with said new downlink beamforming
5 coefficients and further determines from said first plurality of
6 active wireless terminal records a first active wireless terminal
7 record containing an active orthogonal code used for downlink
8 transmissions to a least number of said plurality of wireless
9 access terminals.

1 5. The apparatus as set forth in Claim 4 wherein said
2 controller assigns said active orthogonal code in said first active
3 wireless terminal record to be used in downlink transmissions to
4 said new wireless access terminal.

1 6. The apparatus as set forth in Claim 2 wherein said base
2 station is operable to communicate in S sectors of a cell site
3 associated with said base station and said base station uses up to
4 K orthogonal codes in each of said S sectors for said downlink
5 transmissions and wherein said controller compares said each of
6 said R active wireless terminal records to said new downlink
7 beamforming coefficients in response to a determination that all of
8 said K orthogonal codes are in use in a first sector in which said
9 new wireless access terminal is accessing said base station.

1 7. The apparatus as set forth in Claim 6 wherein said
2 controller determines a first plurality of active wireless terminal
3 records containing corresponding downlink beamforming coefficients
4 that have the least correlation with said new downlink beamforming
5 coefficients and further determines from said first plurality of
6 active wireless terminal records a first active wireless terminal
7 record containing an active orthogonal code used for downlink
8 transmissions to a least number of said plurality of wireless
9 access terminals.

1 8. The apparatus as set forth in Claim 7 wherein said
2 controller assigns said active orthogonal code in said first active
3 wireless terminal record to be used in downlink transmissions to
4 said new wireless access terminal.

1 9. The apparatus as set forth in Claim 2 wherein said
2 controller receives said new downlink beamforming coefficients from
3 a beamforming controller that determines said new downlink
4 beamforming coefficients from an uplink signal transmitted by said
5 new wireless access terminal.

1 10. The apparatus as set forth in Claim 2 wherein said base
2 station is operable to communicate in S sectors of a cell site
3 associated with said base station and said new wireless access
4 terminal is being handed off from a first sector of said cell site
5 to a second sector of said cell site, wherein said each of said R
6 active wireless terminal records are associated with said second
7 sector and said controller receives said new downlink beamforming
8 coefficients from active wireless terminal records associated with
9 said first sector.

1 11. A code division multiple access (CDMA) wireless network
2 comprising a plurality of base stations, each of said base stations
3 communicating with a plurality of wireless access terminals using
4 transmit beams formed by an adaptive antenna array, wherein said
5 each base station comprises:

6 an apparatus for allocating orthogonal codes used for
7 downlink transmissions to said plurality of wireless access
8 terminals comprising:

9 a database capable of storing R active wireless
10 terminal records, each of said R active wireless terminal
11 records containing: 1) an active orthogonal code
12 and 2) corresponding downlink beamforming coefficients used to
13 communicate with one of said wireless access terminals; and

14 a controller associated with said database capable
15 of receiving a notification that a new wireless access
16 terminal is accessing said each base station and, in response
17 to said notification, comparing said each of said R active
18 wireless terminal records to new downlink beamforming
19 coefficients suitable for forming a downlink transmit beam for
20 transmitting to said new wireless access terminal and, in
21 response to said comparison, determines at least one active
22 wireless terminal record containing corresponding downlink

23 beamforming coefficients that have the least correlation with
24 said new downlink beamforming coefficients.

1 12. The CDMA wireless network as set forth in Claim 11
2 wherein said controller assigns an active orthogonal code in said
3 at least one active wireless terminal record to be used in downlink
4 transmissions to said new wireless access terminal.

1 13. The CDMA wireless network as set forth in Claim 12
2 wherein said base station uses up to K orthogonal codes for said
3 downlink transmissions and said controller compares said each of
4 said R active wireless terminal records to said new downlink
5 beamforming coefficients in response to a determination that all of
6 said K orthogonal codes are in use.

1 14. The CDMA wireless network as set forth in Claim 13
2 wherein said controller determines a first plurality of active
3 wireless terminal records containing corresponding downlink
4 beamforming coefficients that have the least correlation with said
5 new downlink beamforming coefficients and further determines from
6 said first plurality of active wireless terminal records a first
7 active wireless terminal record containing an active orthogonal
8 code used for downlink transmissions to a least number of said
9 plurality of wireless access terminals.

1 15. The CDMA wireless network as set forth in Claim 14
2 wherein said controller assigns said active orthogonal code in said
3 first active wireless terminal record to be used in downlink
4 transmissions to said new wireless access terminal.

1 16. The CDMA wireless network as set forth in Claim 12
2 wherein said base station is operable to communicate in S sectors
3 of a cell site associated with said base station and said base
4 station uses up to K orthogonal codes in each of said S sectors for
5 said downlink transmissions and wherein said controller compares
6 said each of said R active wireless terminal records to said new
7 downlink beamforming coefficients in response to a determination
8 that all of said K orthogonal codes are in use in a first sector in
9 which said new wireless access terminal is accessing said base
10 station.

1 17. The CDMA wireless network as set forth in Claim 16
2 wherein said controller determines a first plurality of active
3 wireless terminal records containing corresponding downlink
4 beamforming coefficients that have the least correlation with said
5 new downlink beamforming coefficients and further determines from
6 said first plurality of active wireless terminal records a first
7 active wireless terminal record containing an active orthogonal
8 code used for downlink transmissions to a least number of said
9 plurality of wireless access terminals.

1 18. The CDMA wireless network as set forth in Claim 17
2 wherein said controller assigns said active orthogonal code in said
3 first active wireless terminal record to be used in downlink
4 transmissions to said new wireless access terminal.

1 19. The CDMA wireless network as set forth in Claim 12
2 wherein said controller receives said new downlink beamforming
3 coefficients from a beamforming controller that determines said new
4 downlink beamforming coefficients from an uplink signal transmitted
5 by said new wireless access terminal.

1 20. The CDMA wireless network as set forth in Claim 12
2 wherein said base station is operable to communicate in S sectors
3 of a cell site associated with said base station and said new
4 wireless access terminal is being handed off from a first sector of
5 said cell site to a second sector of said cell site, wherein said
6 each of said R active wireless terminal records are associated with
7 said second sector and said controller receives said new downlink
8 beamforming coefficients from active wireless terminal records
9 associated with said first sector.

1 21. For use in a base station of a code division multiple
2 access (CDMA) wireless network, wherein the base station
3 communicates with wireless access terminals using transmit beams
4 formed by an adaptive antenna array, a method for allocating
5 orthogonal codes used for downlink transmissions to wireless access
6 terminals, the method comprising the steps of:

7 storing R active wireless terminal records, each of the R
8 active wireless terminal records containing: 1) an active
9 orthogonal code; and 2) corresponding downlink beamforming
10 coefficients used to communicate with one of the wireless access
11 terminals;

12 receiving a notification that a new wireless access
13 terminal is accessing the base station;

14 in response to the notification, comparing each of the R
15 active wireless terminal records to new downlink beamforming
16 coefficients suitable for forming a downlink transmit beam for
17 transmitting to the new wireless access terminal; and

18 in response to the comparison, determining at least one
19 active wireless terminal record containing corresponding downlink
20 beamforming coefficients that have the least correlation with the
21 new downlink beamforming coefficients.

1 22. The method as set forth in Claim 21 further comprising
2 the step of assigning an active orthogonal code in the at least one
3 active wireless terminal record to be used in downlink
4 transmissions to the new wireless access terminal.

1 23. The method as set forth in Claim 22 wherein the base
2 station uses up to K orthogonal codes for the downlink
3 transmissions and the step of comparing comprises the step of
4 comparing each of the R active wireless terminal records to the new
5 downlink beamforming coefficients in response to a determination
6 that all of the K orthogonal codes are in use.

1 24. The method as set forth in Claim 23 further comprising
2 the steps of:

3 determining a first plurality of active wireless terminal
4 records containing corresponding downlink beamforming coefficients
5 that have the least correlation with the new downlink beamforming
6 coefficients; and

7 determining from the first plurality of active wireless
8 terminal records a first active wireless terminal record containing
9 an active orthogonal code used for downlink transmissions to a
10 least number of the wireless access terminals.